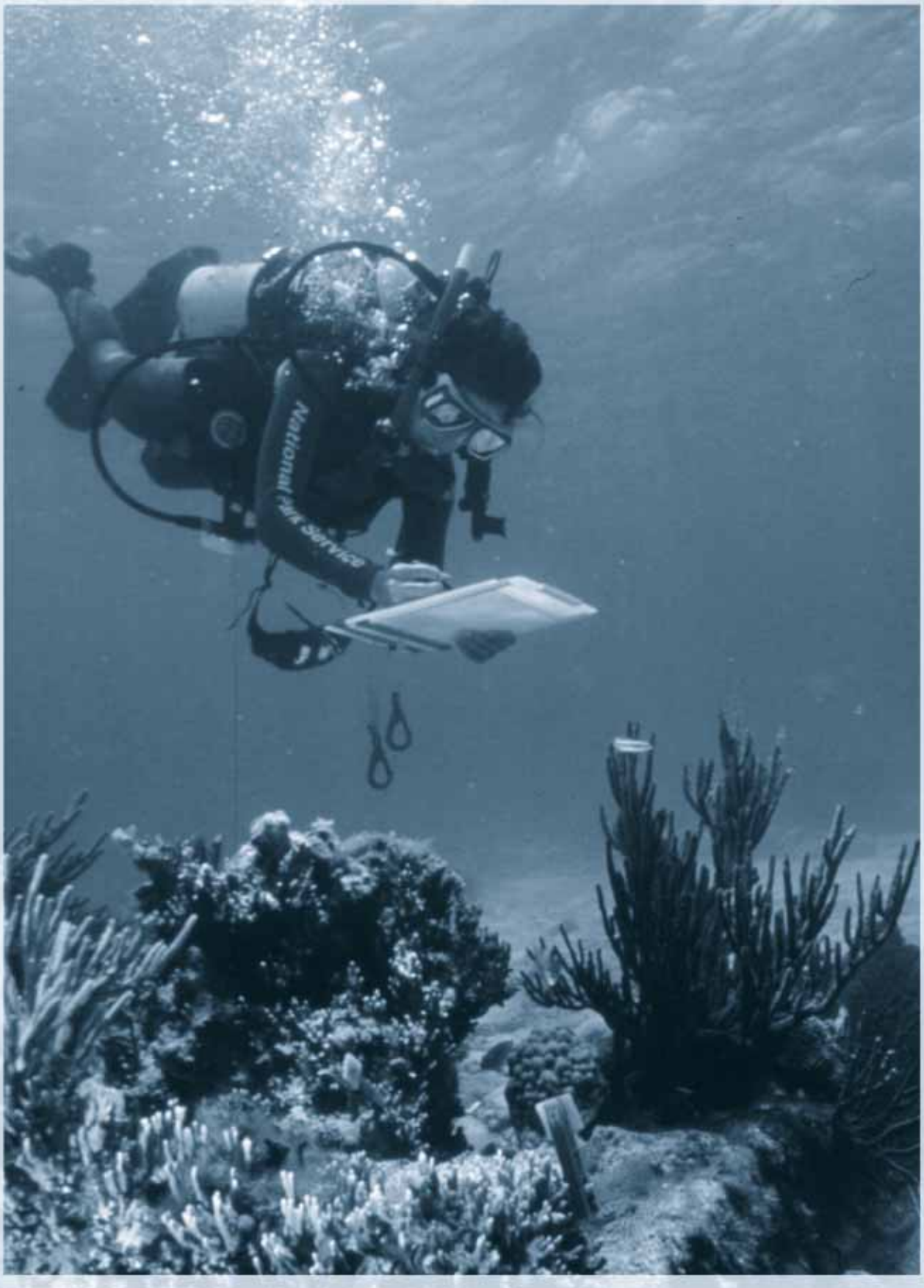

▲ ***An NPS diver*** *sketches iron ballast from a shipwreck amid a coral reef at Dry Tortugas National Park (Florida). Diving is a common resource management activity in units of the national park system for making reef observations and monitoring coral reef communities.*

NEW HORIZONS

Every year, natural resource management in the National Park Service advances through the skillful use and development of legal, technological, and administrative tools. As the following articles demonstrate, some gains are the result of individuals with the training, ingenuity, and drive to recognize opportunities to apply existing tools in new ways or modify them for use in new situations. Others are the product of synergism and represent the collective contributions of several partners working toward a well-defined goal. Also evident in this evolutionary process are fortuitous timing, perseverance, and innovation. In 1998 these elements meshed, propelling the state of natural resource management forward toward new horizons.

New Perspective on Marine Resources

PRESIDENT MANDATES CORAL REEF PROTECTION

by James Tilmant

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Coral reefs around the world are in peril because of degraded water quality, overharvest of reef organisms, predatory imbalances, infectious diseases, and stress from excessive recreational use. The biological diversity of coral reefs is in decline even in many protected areas. On 11 June 1998 President Clinton signed Executive Order 13089 directing all agencies to increase their efforts to protect our nation's coral reef resources. The executive order calls for the establishment of a U.S. Coral Reef Task Force, cochaired by the Secretaries of the Interior and of Commerce. The Task Force will develop and implement a comprehensive program of inventory, monitoring, and research to map and identify the major causes and consequences of degradation of coral reef ecosystems.

The Coral Reef Task Force met at Biscayne National Park in October 1998 and formed five interagency working group subcommittees to focus on ecosystem science and conservation, mapping and information, water and air quality, coastal uses, and international protection of coral reefs. The National Park Service is actively participating in these subcommittees.

Executive Order 13089 provides an opportunity to focus attention on improving protection of the coral reefs entrusted to the National Park Service. As coral reef habitats decline, those existing in our national parks, wildlife refuges, and national marine sanctuaries become increasingly important. Nine national park system units contain coral reefs, but the ecosystems within these parks are not adequately protected. None of the system's coral reef units prohibit all forms of fishing, and six units must allow commercial exploitation of the aquatic resources in accordance with mandated legislative provisions. Only two coral reef parks, Buck Island Reef National Monument and Virgin Islands National Park, have designated no-take zones in which all forms of resource exploitation and harvest are prohibited. Neither of these no-take zones is large enough to allow development of a completely natural, unexploited coral reef community within the protected zone. In addition to resource exploitation, all of the coral reef parks are suffering from the effects of coastal development and degraded water quality.

An increased funding initiative has been included in the President's proposed budget for FY 2000 that will allow for increased monitoring and protection at each of the coral reef parks. Until those funds are available, the National Park Service will use existing budgets to conduct protection measures. The management plans of all coral reef parks will be reviewed and updated within the next three years; mapping and documentation of the current health of the reefs will be completed; water and air quality will be evaluated and documented; and areas are now being considered for expansion where necessary to ensure adequate ecosystem function and protection.

Submerged Cultural Resources Unit, John Brooks

A filter-feeding tunicate *grows on coral at Dry Tortugas National Park. The recent executive order calls for the increased protection of coral reef resources in parks and other federal waters.*

Submerged Cultural Resources Unit, John Brooks

Mojave National Preserve

Contract staff at Mojave National Preserve *haze burros into a holding pen before shipping them to markets where they will be sold as pets, breeding stock, and pack stock. Through cooperative measures, the park removed 520 burros in 1998 in a manner that was cost-effective and sensitive to animal rights concerns.*

Feral Wildlife

FERAL BURRO REMOVAL: NEW SOLUTIONS TO AN OLD PROBLEM GPRA

by Christopher J. Stubbs

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Mojave National Preserve

A perennial problem *in many western parks, feral burros damage plant communities and soils, compete with native wildlife for forage, and degrade water quality.*

Can the National Park Service remove 1,300 feral burros that are roaming free in a park larger than the state of Delaware? Staff at the 1.6 million–acre Mojave National Preserve in California believe so. Through cooperation and creative placement of the animals, Mojave staff removed 520 burros in 1998 alone.

Feral burro populations in Mojave are having deleterious and potentially irreversible impacts on native flora and fauna. Damage has been documented in plant communities, soils, wildlife, and water quality. Of particular concern is the competition for forage, which is negatively affecting the threatened desert tortoise. An adult burro consumes approximately 6,000 pounds of forage per year, and the herds reproduce at an alarming rate. Reproduction estimates for Mojave National Preserve suggest that the population grows an average of 25% each year.

The Natural Resource Preservation Program is providing funding for Mojave National Preserve to capture and remove all of its 1,300 remaining burros over a three-year period from 1999 through 2001. Geographic barriers and existing highway fences outside the park will keep other feral burros out of the preserve.

The greatest challenge and potential impediment to a successful burro removal program is placement of the animals once they are captured. In 1997 the Bureau of Land Management (BLM) wild horse and burro program, which puts the animals up for "adoption" by the public, took 600 burros from Mojave National Preserve. However, the market for burros under the BLM program is currently saturated; therefore the Park Service must consider other placement sources. In 1998, Mojave placed 420 burros through a private contractor at a substantially lower cost than the BLM alternative. The contractor sold these burros for pets, breeding, pack stock, and other recreational purposes. Also in 1998, Mojave National Preserve forged an innovative burro placement agreement with the Fund for Animals, a nonprofit animal rights organization. The Fund has agreed to take up to 1,200 animals at their Black Beauty Ranch, a 2,000-acre animal sanctuary in eastern Texas. One hundred Mojave burros were placed at the Black Beauty Ranch in September.

Working with private markets and the Fund for Animals is a significant departure from the typical federal burro adoption program, and represents a trend of collaboration in dealing with resource threats. Complex resource management issues such as feral burro removal will demand that the National Park Service and other federal land management agencies cooperate with industry, environmentalists, and animal rights groups to carry out its preservation mandate.

Doppler technology *allows resource managers to safely and accurately map flow velocity and depth of large rivers. In this map of the Green River at Dinosaur National Monument (Colorado and Utah), flow direction and velocity are indicated by black arrows—the longer the arrow, the faster the flow. Although hard to appreciate in this depiction, flow depth is indicated by a gradient scale of color from black (2 feet deep) to white (38 feet deep).*

Technological Tools

DOPPLER TECHNOLOGY APPLIED TO LARGE-RIVER STUDIES

by Brian L. Cluer

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Resource managers often need river channel and hydraulic data to describe existing resource conditions or to estimate impacts of a past or potential change in the river's watershed. In small rivers, technicians obtain these data by wading and taking simple measurements of depth and velocity. This topographic and flow information is logistically difficult or impossible to obtain in rivers too deep to wade or during flood events. In the past, flow information from large rivers has been obtained by taking depth and velocity measurements from cables stretched across rivers. Not only are these techniques slow, resulting in very little information for the effort expended, they also limit the locations for data collection. In recent years, hydroacoustic equipment has been produced that fills these scientific data collection needs in large-river environments.

Hydroacoustic echo sounding is commonly used to measure water depth, providing topographic data for river channel mapping. A sophisticated multibeam, hydroacoustic echo sounder is now available that can also measure the velocity of river flows. By sending and receiving acoustic energy from different heights within the water column, and then applying the Doppler shift theory, the acoustic Doppler current profiler (ADCP) determines the velocity and trajectory of particles suspended in the water column. Recent advances have made these new ADCP echo sounder units operable in large rivers where average flow depths exceed 5 feet. Attaching an ADCP to a maneuverable boat, the three-dimensional velocity field of a reach of river can be measured quickly and accurately. When the ADCP is integrated with a navigation/tracking device, such as a survey-grade global positioning system (GPS), spatially precise map data can be collected on the channel bottom topography, the water surface, the three-dimensional flow field, and the discharge of a river reach.

In 1998, staff from the Water Resources Division used an ADCP, integrated with a GPS-GLONASS (combined U.S. and Russian satellite surveying system), mounted on a motorized raft to collect needed flow and topographic data on the Green River in Dinosaur and Canyonlands National Parks in Utah. The integrated system delivered spatial positions with 4-cm accuracy vertically, and 1–2 cm horizontally, correlated with detailed flow depth and velocity data. More than 15,000 data positions distributed over a 4-mile reach were measured in about 15 hours from a powerboat zigzagging back and forth across the river channel. Channel maps, water surface maps, and flow field (velocity) maps of two 4-mile reaches were constructed from the data obtained in June 1998. The river channel and hydraulic data collected using the ADCP and GPS-GLONASS are substantially more detailed and accurate than data obtained using conventional means, and take much less time to acquire.

INTERNATIONAL CONTINGENT AT FUNDAMENTALS TRAINING

In January, 20 resource managers from the National Park Service attended the third Fundamentals for Natural Resource Management at the Albright Training Center at Grand Canyon National Park (Arizona). In addition to NPS staff, five park managers from South Africa participated in the course. Their perspectives on such issues as subsistence uses and managing parks on tribal lands added a valuable dimension to the training. The fundamentals course provides a sound introduction to natural resource management in the national park system with two primary emphases: an ecosystem approach to management and planning, and the implementation of a resource management program that includes natural, cultural, and social science considerations.

NATURAL RESOURCE INFORMATION TOOLS MAKE THEIR WAY TO THE WEB

by Jen Coffey

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PUBLICATION RELEASED ON CD

Sixty-seven issues of Park Science, from the inaugural 1980 edition to the present, were electronically published in a fully indexed, two–CD-ROM set and released to readers in November. This new information tool provides an efficient way for resource managers and researchers alike to search for resource management topics and articles of interest.

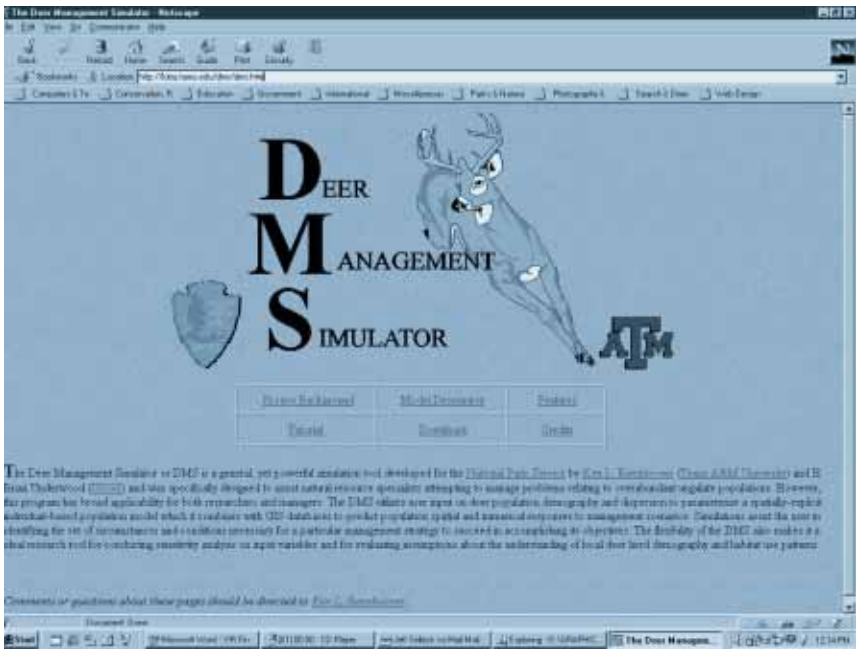
A migration to web-based information systems is gaining momentum throughout the National Park Service as the Internet continues to grow at an unprecedented pace and more parks get connected to the web. During the past year, natural resources has joined in this trend of adopting web technologies on both NatureNet, the National Park Service's public natural resource website (www.nature.nps.gov), and the Natural Resources Intranet (www1.nrintra.nps.gov), which is available to NPS personnel only.

A good example of a useful natural resource information tool that debuted on the web in March 1998 is the *Environmental Contaminants Encyclopedia* (www.nature.nps.gov/toxic/index.html). The encyclopedia is a tool that can be used to quickly ascertain general information about 118 environmental toxicology elements, compounds, and products. The website is particularly useful because it summarizes information on environmental contaminants in a single, easily searchable source. The encyclopedia is used not only by those in the National Park Service but also by other agencies and organizations, which makes the web the perfect medium for this information.

Another useful tool was made available in 1998 for downloading from both the Internet and the Intranet. The White-tailed Deer Management Simulator (lutra.tamu.edu/dms/dms.htm) is a general but powerful simulation tool developed for the National Park Service by Ken L. Risenhoover (Texas A&M University) and H. Brian Underwood (U.S. Geological Survey). The Deer Management Simulator helps natural resource specialists develop management strategies to deal with overabundant ungulate populations. The simulator also provides researchers with valuable information.

> "A migration to web-based information systems is gaining momentum throughout the National Park Service."

In December 1998 the Investigators Annual Report (IAR) was added to the web. This database, used by researchers holding permits from the National Park Service to report on research activities conducted within parks, is made available to both NPS and non-NPS users. Non-NPS researchers around the globe can now access the system via the Internet while park staff and IAR coordinators access the system through the Natural Resources Intranet. In both cases, the database is password protected. (For instructions on accessing the database, parks should contact their regional IAR coordinator, and non-NPS researchers should contact the park in which they want to conduct research.) Because researchers can enter their information directly into the database through their web browser, the web-based program saves both time and paper. A standardized research and collecting permit is also under development, with plans to add it to the Internet in 1999.



The White-tailed Deer Management Simulator *is one of the natural resource management tools that debuted on the web in 1998.*

Legal Tools

CONGRESS PLACES A POSITIVE IMPRINT ON PARK MANAGEMENT

by Mike Soukup

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In 1998, Congress enacted the National Parks Omnibus Management Act. "Omnibus" befits the statute, which covers a wide range of topics, including a major overhaul of NPS concession management. For natural resources the statute contains a mandate for the use of science in park management decisions throughout the organization. Thus, Congress has underscored the need for the Park Service to manage parks based on sound scientific and natural resource management principles and information.

Several of the act's provisions build on efforts already under way in many parks, and they reinforce the timeliness of the Director's Natural Resources Initiative unveiled last fall. Section 101 of the act directs the Secretary of the Interior to continually improve the National Park Service's ability to provide and demonstrate its scientific basis for its management, protection, and interpretation of park resources. The remaining natural resources–related provisions state how to achieve this goal. For example, section 102 requires the Park Service to develop a comprehensive training program for all employees to ensure that they are equipped with "the best, up-to-date knowledge, skills, and abilities" to protect park resources. The next section calls for enhanced management opportunities for career employees with specialized academic backgrounds, such as in the sciences and resource management, to assume park management positions, especially superintendencies.

Provisions in Title II relate to the role of research in park management. Section 202 sets forth a research mandate for the secretary to provide for the highest-quality science and its use in decision making. Section 203 builds on this direction by promoting cooperative agreements with universities and colleges to obtain multidisciplinary research results and information products to improve park management at local and regional levels. Later, the legislation encourages the pursuit of scientific study in parks by a broad range of entities so long as that research is commensurate with park protection. Section 204 reinforces efforts already under way in many parks to collect and maintain baseline data on park resources for the assessment of long-term trends in their condition. Another provision enables the Park Service to withhold the location of certain vulnerable resources in parks when responding to Freedom of Information Act requests.

Pulling all these provisions together is section 206, which designates superintendents as accountable for using the results of scientific study in their management actions. According to the act, the trend in the condition of resources will be a "significant factor in the annual performance evaluation of each superintendent." Finally, section 801 calls for an evaluation of NPS law enforcement programs, a critical component of resource stewardship.

Adherence to the direction contained in the Omnibus Act, coupled with the Natural Resource Initiative and other efforts, should help the National Park Service to be a successful and prudent manager of the nation's natural and cultural heritage in the 21st century.

***Published in the* Congressional Record,** *the National Parks Omnibus Management Act became law in October.*


October 13, 1998 CONGRESSIONAL RECORD — HOUSE H10679

TITLE I—NATIONAL PARK SERVICE CARE DEVELOPMENT, TRAINING, AND MANAGEMENT

TITLE II—NATIONAL PARK SYSTEM RESOURCE INVENTORY AND MANAGEMENT

TITLE V—FEES FOR USE OF NATIONAL PARK SYSTEM

TITLE VI—NATIONAL PARK PASSPORT PROGRAM

TITLE VII—NATIONAL PARK FOUNDATION SUPPORT

TITLE VIII—MISCELLANEOUS PROVISIONS

The Gold Strike Casino *at Lake Mead National Recreation Area is a good example of the development, unrelated to mining, that can legitimately occur on many patented mining claims in parks. The recent solicitor's opinion will likely reduce the issuance of future park patents and associated facilities on parklands.*

SOLICITOR OPINIONS ADVANCE PARK PROTECTION

by Julia Brunner and Carol McCoy

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In 1997 and 1998 the Solicitor of the Department of the Interior issued four legal opinions that limit the rights of mining claimants on federal lands and confirm that the Secretary of the Interior has a duty to address park protection concerns external to park boundaries in departmental decisions. Both of these legal advances help strengthen the ability of the National Park Service to protect park resources from both internal and external development.

MINING CLAIMS Despite restrictions in most park enabling statutes, the solicitor previously advised the Park Service that owners of valid unpatented mining claims had the right to patent their claims in parks. An unpatented mining claim is a right established under the 1872 Mining Law by which the owner may extract the minerals and use, but not own, the surface. The patenting process allows claimants to obtain title to the surface and minerals of their claims. Such owners can develop their claims in a manner that creates long-term, conflicting uses in parks.

Spurred by recent federal court decisions, the solicitor reexamined the 1872 Mining Law and issued two opinions that significantly reduce the eligibility of claimants to patent their claims on withdrawn lands like parks. On such lands, patents may only be obtained *if* the secretary determines that a claimant complied fully with the patenting requirements of the 1872 Mining Law *by the date of withdrawal,* generally the date of park establishment. These requirements include fees, a survey, paperwork, and the discovery of a valuable mineral deposit as determined through a validity exam. If claimants fail any requirement, they are ineligible for a patent but still may be able to mine subject to NPS regulations. The solicitor's new direction is significant and should reduce the number of future patents in parks.

The third opinion states that claimants may only hold and patent one mill site consisting of 5 acres per associated mining claim. A mill site is an area that is nonmineral in character where claimants typically site support facilities. In reviewing claim records, the solicitor became aware that claimants possessed far more mill-site acreage than allowed under the 1872 Mining Law. For example, at Mojave National Preserve in California, a claimant submitted a proposed plan covering two unpatented mining claims and 18 mill sites for NPS approval. Under the solicitor opinion, the claimant is entitled only to two mill sites. Thus, this opinion also enhances park protection by clarifying the property rights of claimants.

EXTERNAL DEVELOPMENT As part of the secretary's deliberation on prospecting permit applications for lead in the Mark Twain National Forest adjacent to Ozark National Scenic Riverways in Missouri, the solicitor prepared an options paper dated 16 April 1998. The solicitor makes clear that, in the administrative record, the secretary must carefully account for potential impacts to park resources from external activities within the Department of the Interior's domain. While the solicitor does not conclude that the secretary *must* place park protection considerations above all others, this is a very positive step toward applying the 1978 Redwoods Amendment to the Organic Act beyond park boundaries.

Southwest willow flycatcher survey, by Robert Winfree; Glacier research at Glacier National Park

Researchers from the desert Southwest to the northern Rockies and beyond will benefit from the simplified NPS research and collecting permit developed in 1998. To be implemented in late 1999, the new process will be easier for NPS administrators to manage and will encourage more researchers to include national park system units in their research design.

Administrative Tools

RESEARCH AND COLLECTION PERMIT PROCEDURES REVISED

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Scientists and educators who have wished to conduct studies in units of the national park system have routinely dealt with a daunting assortment of permitting processes, forms, and other requirements, many of which are unique to a specific park. Indeed, the complex and extremely time-consuming NPS application process has deterred the inclusion of national park system units in broad regional studies and kept many scientists from working in units.

In September 1997 a team of 15 representatives of several parks and offices convened to do something about the unwieldy materials and processes of the NPS research and collecting permits. This dynamic team forged ahead in 1998 and generated an entire set of permitting materials that is appropriate for NPS-wide use and that complies with the Paperwork Reduction Act requirements. Upon completion the guidelines and other materials will be applicable to the widest possible range of scientific disciplines.

When the new system is implemented late in 1999, researchers can obtain applications and guidelines for study proposals and general permit conditions directly from parks, or even download them from a website on the NPS Intranet. Many, if not most, parks will also provide applicants with supplementary materials such as brochures, maps, and local regulations.

Each permit applicant must provide a study proposal explaining the who, what, when, where, why, and how of the proposed study. The guidelines outline exactly what information the parks need and include a list of common criteria for making a permitting decision. Applications must be submitted in writing. However, the process is designed to allow future development of electronic applications. The two-page application form has several new questions to determine whether a researcher's proposed activities, such as public surveys or commercial applications, require additional review and approval. Applications for studies throughout a large geographic area can be duplicated and submitted to more than one park, and permitting can be coordinated between or among the parks. The application includes a form for detailing plans for collecting specimens and for designating a repository for preserved specimens. Permits will be created and tracked with new computer software.

> "... an efficient process will increase the number of good scientific studies in the parks ..."

Development of standard and clear guidelines for the administration of scientific research and collecting permits for the national park system will simplify the application process not only for applicants but also for permitting officials. In the long run, an efficient process will increase the number of good scientific studies in the parks, make available better scientific information for park managers, and improve the reporting of scientific studies in parks.

ALTERNATIVE TRANSPORTATION

The shuttle-bus system envisioned at Zion National Park (Utah) progressed in 1998 as buses were ordered in June and construction on a visitor transit center and maintenance facility began in August. Meanwhile, at Grand Canyon National Park (Arizona), staff began assisting the Federal Transit Administration late in the year in preparing their report that addresses congressional inquiries over the costs associated with a light-rail transportation system proposed for the South Rim. Construction on the light-rail system is expected no earlier than summer 2000.

Great Sand Dunes National Monument *(Colorado) is the site of an aquifer-system-modeling project funded by the Recreational Fee Demonstration Program. During 1998 fee demonstration funding of natural resource management projects was roughly equivalent to that provided by the Natural Resource Preservation Program, the largest dedicated funding source for natural resource projects, excluding inventories.*

FEE DEMONSTRATION FUNDS BOLSTER NATURAL RESOURCE PROTECTION

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From 1997 to 1998 the National Park Service collected $140 million in fees through the Recreational Fee Demonstration Program. Authorized in 1996 for three years, the program originally allowed the National Park Service to retain a portion of user fees collected in certain parks, with the remainder to be returned to the U.S. Treasury. In 1998, legislation creating the program was amended to extend it through FY 2001 and allow retention of all receipts. Congress intended the funds to be used in support of the backlog of various park improvement projects that paying park visitors can appreciate.

An initial group of projects worth $79.6 million was approved in September 1997 and strongly emphasized the backlog of park infrastructure needs; an additional $61.9 million in projects were forwarded for additional approvals. Based on project titles alone, at least 46 of the approved projects out of more than 800 titles related principally to natural resource protection. These totaled about $3.9 million for exotic species control, threatened and endangered species inventory, resource impact studies, and habitat and species restoration. These figures demonstrate the importance of this new funding source for resource protection. In November 1998, with increased receipts anticipated, $55 million in additional projects were approved. Although first priority was given to critical health and safety needs, nearly 40% of the receipts retained by fee demonstration parks (excluding the cost of fee collection) went to natural or cultural resource protection projects. In addition, 20% of the receipts collected were distributed to projects in parks where no fees are collected or to projects that apply broadly to the national park system. Additional natural resource–related projects are likely to be approved from these funds in the future.

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MAJOR FUNDING FOR WATER RESOURCES

In October, Congress funded a $2.5 million program under the Clean Water Action Plan that focuses activities of the U.S. Geological Survey (USGS) on water-quality issues in national parks. All projects to be pursued stem from needs identified in park resource management plans and were developed cooperatively between parks and USGS district offices. In spring 1998, 35 of 77 projects were selected, which fall into three categories: cyclic, long-term monitoring studies; intensive or synoptic studies; and technical assistance. This appropriation dwarfs NPS funds for projects and technical assistance related to water resources and provides a tremendous boost to parks.

The number and value of 1998 resource protection projects from the fee demonstration funds are difficult to determine precisely. Many of the nearly $16 million in resource protection projects involve cultural resources, especially structures. Numerous other projects, whether primarily for resource protection, health and safety, or visitor services, meet multiple objectives. For example, projects to add or replace bear-resistant food containers at Glacier Bay, Lassen, Crater Lake, and Olympic are ascribed to health and safety; however, in addition to protecting visitors, these projects protect bears by helping to prevent their habituation to human food sources. As another example, trail and campground restoration projects are categorized in some cases as resource protection projects and in others as visitor services projects. Additionally, many water-related projects meet multiple objectives.

Beyond these multipurpose projects, at least $4.5 million—over 10% of the value of projects—has been spent on projects with natural resources as their principal direct beneficiary, based on an analysis of project titles. A closer examination of all project descriptions would likely yield even more. These natural resource projects include exotic species control at Glacier, White Sands, Cuyahoga Valley, Pictured Rocks, Theodore Roosevelt, Death Valley, and Haleakala; restoration of native species, including threatened and endangered species, at Badlands, Assateague Island, Haleakala, Hawaii Volcanoes, and Joshua Tree; and a paleontological excavation at Badlands.

Fee demonstration projects even include resource inventory, monitoring, and studies. Although these projects are not as visible to the public as most, visitor center displays and other means can be used to explain the need for these types of fee-funded projects. Examples of such projects are bear studies at Denali; a grassland assessment at Glacier; modeling of an aquifer system at Great Sand Dunes; a rare plant survey and development of beach survey techniques at Assateague Island; and grizzly bear population modeling, a geothermal inventory, aspen research plot installation, a pronghorn ecology study, and quantification of the importance of winter roads for bison at Yellowstone.